DEPRESSION POST-MYOCARDIAL INFARCTION: PRIMARY CARE RECOGNITION AND MANAGEMENT TO DECREASE MORTALITY

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Depression Post-Myocardial Infarction: Primary Care Recognition and Management to Decrease Mortality

Abstract

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Background: Myocardial infarction (MI) is a serious, life threatening condition with the potential to leave a survivor with a variety of sequelae, including depression. Post-MI depression is present in up to one third of all MI survivors and has been shown to increase the risk of mortality up to three fold.
Purpose: The purpose of this paper was to review current practices in the recognition and diagnosis of post-MI depression, treatment options, and the potential benefits associated with primary care recognition and management of post-MI depression.
Data Sources: Data for this article was obtained from several databases, including CINAHL, Academic Search Complete, and MEDLINE. Also, the CDC website was utilized, as was up-to-date.
Conclusions: Many sources have determined a correlation between post-MI depression and poorer outcomes. Recognition and management of this depression has the potential to improve outcomes and decrease mortality following an MI. There are several effective tools to assist with the assessment of depression, including the two question and nine question personal health questionnaires (PHQ2 and PHQ9 respectively) and the Beck Depression Index (BDI). These tools are easily administered in the primary care setting by trained individuals. Research has also assessed the safety and efficacy of a variety of depression treatment options. Selective Serotonin Reuptake Inhibitors (SSRIs), Cognitive Behavioral Therapy (CBT), and cardiac rehabilitation have been studied and appear to be safe and effective measures to help decrease post-MI depression, thereby helping to decrease mortality in this population. Recognition and management of post-MI depression will assist in improving patient outcomes and decreasing mortality.

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Depression Post-Myocardial Infarction: Primary Care Recognition and Management to Decrease Mortality

A Myocardial Infarction (MI), or heart attack, is a potentially life threatening condition that affects many people in the United States. In a random-digit-dialed survey conducted by the Center for Disease Control (CDC), 4% of respondents reported a history of MI (CDC, 2007). MI is defined as "the ischemic death of myocardial tissue associated with atherosclerotic disease of the coronary arteries" (Porth, 2002). While an MI may be lethal, those who do not die from it are left with a variety of potential sequelae. Some of the more well-recognized consequences include congestive heart failure (CHF) and cardiac arrhythmias. There are other, potentially life threatening effects that are not as commonly recognized.

One of the lesser recognized potential sequelae of an MI is depression. With major depressive disorder, a patient will have at least five of the following symptoms present during the same two-week period, with diagnosis requiring presence of either of the first two symptoms. The symptoms outlined in the Diagnostic and Statistical Manual (DSM) are: 1)depressed mood most of the day, nearly every day, 2) marked decreased interest in most or all activities, 3) significant, unintentional weight loss, 4) difficulty sleeping or excessive sleep, 5) increased or decreased activity level, 6) fatigue, 7) feelings of guilt or worthlessness, 8) difficulty thinking or concentrating, 9) recurrent thoughts of death and/or suicide, (American Psychiatric Association, 1994). Depression is known to be associated with a multitude of chronic diseases, including Diabetes Mellitus (DM), cancer, and stroke. It has also been found that chronic disease in the presence of depression has worse outcomes (Ismail, 2011). The research by Ismail (2011) found that patients with co-morbid depression and diabetes experienced more symptoms of their illnesses than their non-depressed counterparts. Similar can be said for the presence of depression post-MI.

Over 33% of patients will exhibit symptoms of depression soon after an MI and major Depression develops in almost 20% of people after an MI (Tofler, 2009 & Tofler, 2010). Depression, in this

population, was shown to "increase risk of death two to three fold," (Tofler, 2010). Depression that occurs as a result of the MI is termed "incident depression" (Post-Myocardial Infarction Depression Clinical Practice Guideline Panel, 2009). Incident depression may remit spontaneously, or may progress to major depression, which is defined as "a serious psychiatric illness that negatively affects how an individual feels, thinks and acts" and is present for two weeks or more, (Stuart & Laraia, 2005, p332). Major depression develops in almost 20% of people after an MI. Research of antidepressant use in this population has shown that Selective Serotonin Reuptake Inhibitors (SSRIs) are safer than use of Tricyclic Antidepressants (TCAs) (Davidson, Kupfer, Bigger, Califf, Carney, Coyne , Czajkowski, et al, 2006). The purpose of this paper is to review current practices in the recognition and diagnosis of post-MI depression, treatment options, and the potential benefits associated with primary care recognition and treatment of post-MI depression.

Methods

All searches performed for this paper included limiting the search to articles/studies completed within the past ten years. CINAHL and Academic Search Complete were accessed through the Washington State University library. The search began with inclusion criteria of "myocardial infarction" and "depression," both as title term searches. This returned 111 results. The search was further narrowed by addition of the criteria "management," which returned only two articles. By changing "management" to "outcomes," 34 articles were found. Of these 34 articles, six were available full text with the search terms in the title. The CDC website was also utilized to find current statistical data by searching for "myocardial infarction prevalence" and "myocardial infarction mortality." This research gave background information of available trials and studies, leading to further searches within the above mentioned databases.

Sertraline Antidepressant Heart Attack Randomized Trial (SADHART), the Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation (COURAGE), the Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD) study and the Atorvastatin Versus Revascularization

Treatments (AVERT) trial were reviewed. The information in these studies helped to further guide the literature review. After review of these studies, a search was done using Academic Search Complete, with the search terms "SSRI" and "MI." This returned seven relevant articles.

From the information gathered in these articles, additional searches were completed to obtain the background to current, available research. This search was done within CINAHL with the search terms antidepressant and cardio*, which returned 24 articles. After further study, three of these articles were found to have relevant content. This search also revealed a common primary source: the article by Parashan. A search was completed to find this original article. Also, the above studies propagated a search within MEDLINE searching for the terms "PHQ2" and "time." This search returned one related article. The compilation of above mentioned articles were then categorized into several sections to organize the literature review.

The research for the literature review was separated into sections include the association of depression and MI, the negative outcomes of depression after MI, current screening guidelines/practices, the safety of SSRI use and other methods of treating depression in the cardiac patient population, and, speaking directly to the purpose of this paper, the effectiveness of decreasing depression to improve outcomes after MI.

Literature Review

Association of depression and MI

Davidson, Kupfer, Bigger, Califf, Carney, et al (2006) utilized two tools to assess for presence of depression in patients who experienced an MI for the first time, with no history of depression. The assessment tools used included the first generation of the Beck Depression Index (BDI) and the Patient Health questionnaire (PHQ). In regard to the PHQ, the shorter, two question version (PHQ2) was used as the first step for depression assessment. If either question is positive, it was recommended to follow-up with the nine question version of the assessment tool (PHQ9). The results of this study showed that up to

20% of participants met criteria for a diagnosis of major depression after MI. To further support this 2006 study, Tofler (2010) expanded on these findings.

Tofler (2010) conducted descriptive research, studying correlation of psychosocial factors and outcomes in patients post-MI. For this research, a questionnaire was given to 887 participants to complete independently. The findings of this study revealed that 33% of patients had symptoms of depression after MI and that 20% showed symptoms of major depression. Additionally, the author found that those who reported mild to moderate depression one week after MI were at risk for mortality during a one year follow-up, though this risk is not quantified by the author. The author adds that the presence of strong social support did not seem to alter these results. In reviewing this information, it was found that additional information was necessary to demonstrate the range of depression in post-MI patients.

Parashar, Rumsfeld, Spertus, Reid, Wenger, et al. (2006) further delineated depression after MI based on timing and remissive periods. The authors used the Seattle Angina Questionnaire (SAQ) to study physiologic symptoms and the Quality of Life (QOL) survey to look at psychological symptoms, as well as the PHQ to determine severity of depression symptoms. The results of these surveys lead researchers to divide participants based on PHQ scores as follows, with baseline obtained prior to hospital discharge: 1) no depression: PHQ <10 at baseline and at one month, 2) new depression: PHQ <10 at baseline and > or = 10 at one month, 3) transient depression: PHQ > or = 10 at baseline and <10 at one month, 4) persistent depression: PHQ >10 at baseline and at one month. The results showed that 20.6% of participants had severe depression during hospitalization and 13.1% had depression at one month following discharge. Further dividing these numbers into the above mentioned criteria, 73.5% had no depression, while 7.1% had persistent depression, 6% had new depression, and 13.5% had transient depression. Aligning with research discussed above, this research shows that 26.6% of patients experienced one of the types of post-MI depression.

There have been many other post-hoc studies of the research found in the ENRICHD and SADHART trials, which will be outlined in the following sections. Researchers have also done multiple

studies with regard to a specific antidepressant to study the effectiveness of decreasing post-MI depression. These studies shared a common-thread of looking at the safety of the medication in a vulnerable cardiac population. These studies will also be mentioned in more detail below.

Negative outcomes post-MI with depression

Kurdyak, Gnam, Goering, Chong, and Alter (2008) looked at the relationship between depression and utilization of health care resources after MI and found, with the exclusion of hospitalization time for the initial MI, there was a 24% total increase in hospitalization days, with a 9% increase in cardiac hospitalization days and a 43% increase in non-cardiac hospitalization days. The researchers for this article used a variety of assessment tools, including the socio-economic and acute MI study (SESAMI), the Global Registry of Acute Coronary Events (GRACE) prognostic index and the Duke Activity Status Index (DASI). The SESAMI was comprised of 12 questions, 9 of which were based on the Brief Carroll Depression Rating Scale (BCDRS) and was administered via telephone. From this research, the authors found that participants with better prognosis (lower GRACE index scores) and better functional capacity (higher DASI scores), but with depressive symptoms (higher SESAMI scores) were more likely to seek medical attention than their higher-risk counterparts.

Parashar, et al. (2006) looked at the mortality rate and re-hospitalization rate six months after initial MI in participants with no depression, transient depression, new depression, and persistent depression after MI. The participants without depression had a 2% mortality rate and a 26.6% re-hospitalization rate. The mortality rates for transient depression did not change, but the re-hospitalization rate increased to 36.3%. With new and persistent depression, the rates increased to 3.6% and 41.6%, and 3.8% and 38.3% respectively. In summary, post-MI depression causes increased morbidity and mortality.

Current screening guidelines/practices

Outside of the context of a research study, post-MI depression is assessed based on presenting symptoms. A provider does not automatically initiate depression screening for a patient who has returned from a hospital admission post-MI. A certain population of providers may assess depression in their

chronic disease patients, but there is not a clear recommendation for if and/or when this needs to occur. The following studies attempt to better define the guidelines for practice.

The Post-Myocardial Infarction Depression Clinical Practice Guideline Panel (2009) from the American Academy of Family Practice was designed to examine research and develop an evidence-based guideline for the recognition and management of post-MI depression. Four distinct recommendations resulted from their research. The first recommendation suggests that patients having an MI should be screened for depression at regular intervals, with the initial screening during hospitalization. This recommendation further suggests that the depression screening be completed using a standardized screening tool, but does not support one tool over another. The second recommendation states that, if depression is diagnosed, it should be treated and regular follow-up should ensue. The third recommendation builds upon the second recommendation to treat, stating that SSRIs are preferred over TCAs for the treatment of post-MI depression, based on safety in the cardiac population. The fourth, and final, recommendation is that some form of psychotherapy may be beneficial for the treatment of post-MI depression.

Thombs, Jonge, Coyne, Whooley, Frasure-Smith, et al (2008) studied depression screening and patient outcomes. From their research, they determined that there is a high prevalence of depression post-MI and that there are adverse health care outcomes associated with this depression. However, the suggestions drawn from their research discourage the routine screening and treatment of depression, explaining that such screening would "likely be unduly resource intensive and would not be likely to benefit patients in the absence of significant changes to the current models of care," (Thombs, et al, p2169, 2008). However, not all researchers agree that treatment screening is too "resource intensive."

The statement that depression screening is too "resource intensive" is argued by Ebell (2008). Ebell's article states that the PHQ2 is an adequate screening tool. This assessment tool consists of two questions, 1) have you often been bothered by feeling down, depressed, or hopeless? and 2) have you often been bothered by little interest or pleasure in doing things? If the answers to both of these questions

are no, then there is no further assessment required. If the answer is yes, then the PHQ2 should be followed up with a more extensive assessment tool, for example the PHQ9. At that point, the assessment may become more intensive, involving further assessment of depressive symptoms. However, the PHQ2 was found in Ebell's study of 1,419 people to be 87% sensitive and 78% specific, implying that a more "resource intensive" assessment is appropriate and justified (Ebell, 2008).

Opinions regarding the screening for post-MI depression are polarized, as outlined above. This difference of opinion makes it difficult to determine what the best action is for the provider. At this time, there are not clear recommendations for or against screening patients for depression after MI. This leaves the decision up to the provider, who may or may not be aware of the prevalence of depression in the post-MI population.

Safety of SSRI's and other antidepressant therapy in cardiac population

In a study that compared available research to examine the safety of SSRIs vs TCAs, it was found that TCAs are suspected of increasing risk for negative cardiovascular events, including MI. SSRIs were found to be safe in the presence of cardiovascular disease. The author reports that SSRIs have been found to possibly reduce mortality, but this is followed by the inclusion criteria of positive response to treatment for the mortality rate reduction. The article also addresses the variety of SSRIs and differentiates which maybe the safest for treatment post-MI. Citolopram and Paroxetine were shown to be the safest for use in depression post-MI, with their reported safety in the presence of Coronary Artery Disease (CAD) (Taylor, 2008). Other medications have not been studied in enough detail to determine effectiveness of long-term ability to reduce mortality post-MI, or the safety of their use in this population.

Taylor (2008) also looked at the use of other medications that could potentially be used in the management of post-MI depression. The author reports that the Selective Serotonin-Norepinephrine Reuptake Inhibitors (SSNRIs) Reboxetine, Duloxetine and Venlafaxine are drugs to avoid in the presence of hypertension. TCAs and Mirtazepine were shown to cause significant orthostatic hypotension. TCAs, Trazodone, and Venlafaxine should be avoided if a patient has a known risk for arrhythmia. The drug

Bupropion was shown to have no effect, positive or negative, on cardiovascular events in the first year after MI (Taylor, 2008). While this information may help to guide future studies, there is not a clear determination with regard to safety in the post-MI population. For the post-MI population, the class of antidepressants that has been studied in greater detail is the SSRIs, specifically Paroxetine, Citalopram, and Sertraline.

Glassman & O'Connor (2002) completed the Sertraline Antidepressant Heart Attack Randomized Trial (SADHART) to study the safety and efficacy of the SSRI Sertraline. In evaluating the safety of this medication, the authors looked at patients with unstable angina or recent acute MI. The researchers developed extensive exclusion criteria, including uncontrolled hypertension, anticipated cardiac surgery during the next six months, MI or unstable angina that occurred less than three months after a Coronary Artery Bypass Graft (CABG), resting heart rate less than 40, MI or unstable angina not of atherosclerotic origin, Killip Class III or IV status, and use of any of the following medications: 1) class I antiarrhythmic, 2) Reserpine, 3) Guanethidine, 4) Clonidine, 5) Methydopa, 6) anticonvulsants or neuroleptics, 7) antidepressants, 8) benzodiazepines, 9) psychotherapy within three months prior to study entry, 10) any other medical conditions such as significant renal or hepatic dysfunction. The results of this study revealed that Sertraline was safe for the population studied and effective at improving major depression. The SADHART trial has led to Sertraline being the most studied SSRI for use in the post-MI population.

The benefit of SSRIs may be limited by the existence of co-morbid medical conditions and/or the potential for polypharmcy, including, but not limited to, medications for management of cardiac disease in the post-MI population. Le Melledo and Perez-Parada (2005) looked at the use of SSRIs to treat post-MI depression to determine if interactions or side effects of SSRI use may alter the potential benefits of therapy. They report that there is potential for interaction between SSRIs and cardiovascular medications, not revealed by the SADHART due to the strong exclusion criteria. Also, the authors address the increase in low-density lipoprotein (LDL) levels that is associated with use of certain SSRIs, as well as the potential for weight gain with long-term SSRI use. They address these side effects as risk factors for

negative cardiac outcomes and suggest caution when considering SSRI therapy, though there are no reported statistics regarding incidence of these side effects.

Litinas, Fareed, Iqbal, Tobin, Piletz, Meresh, and Halaris (2010) teamed together to study the possible cardiac benefit associated with use of SSRIs. Their research looked at how serotonin is utilized in platelets. The authors explain that when platelets become activated, they release serotonin as part of the process of aggregation. They believe that SSRIs also inhibit reuptake at this level, which further decreases the amount of serotonin that platelets have to release, thereby decreasing platelet aggregation in response to insult or injury. During the course of their research, it was found that after 4 weeks, platelet aggregation in participants not treated with an SSRI was 95%, compared to 37% in those treated with an SSRI. However, the researchers report a non-quantified reduction in this benefit at 8 weeks, suggesting that this benefit may be time limited.

There has been research that expands on the management of post-MI depression, looking beyond the use of prescription medications. Tofler (2009) studied multiple approaches for treating post-MI depression. The results of drug therapy research analysis had shown similar results to that already described above, stating that TCAs may have increased arrhythmic deaths and SSRIs were the safer, more efficacious option for this population. Additionally, Tofler looked at psychosocial interventions to treat depression, including a review of the ENRICHD Study. It was found that patients receiving cognitive therapy for the treatment of post-MI depression had a non-quantified decrease in depression, as well as improved perception of support. However, the group receiving cognitive therapy had no change from the control group with regard to mortality; both groups had 24% mortality rate. There was no harmful effect of cognitive therapy reported, indicating that this therapy does not pose a safety concern.

Cognitive therapy is not the only intervention available for patients to receive support post-MI. Patients may be prescribed a regimen of cardiac rehabilitation, often prescribed by the health care provider to assist the patient to return to normal physical, functional capacity. Research by Milani and Lavie (1998) looked at the effectiveness of cardiac rehabilitation programs as a means to decrease

symptoms of depression. This study included 268 patients over the age of 65, who had recently experienced a major cardiac event. The cardiac events utilized as inclusion criteria included MI, CABG, or angioplasty. 48 of the participants were diagnosed with depression prior to initiation of cardiac rehabilitation, though the researchers did not disclose time of depression diagnosis in relation to time of cardiac event. The rehabilitation program was twelve weeks in duration, at the end of which 30 of the 48 patients originally diagnosed with depression had complete resolution of symptoms. Of the remaining 18 participants, 8 had moderate depression, while 10 had severe depression. This study does not account for the possibility of spontaneous remission of depressive symptoms and does not describe medication regimens for the participants.

Effectiveness of decreasing depression to improve outcomes

Sorensen, Brandes, Hendricks, Thrane, Friis-Hasche, Haghfelt, and Bech (2006) assessed post-MI depression over one year to determine differences in mortality. In agreement with the articles described in the sections above, the authors found that depression was an independent risk factor for increased mortality, reporting "a two-fold or more difference in mortality rate between patients with depression and those without." The article goes on to explain that the SADHART study estimated a 20% reduction in mortality for participants who received treatment for depression. The SADHART study has been utilized by additional researchers, who reviewed different aspects of the original research.

In assessing the information obtained in the SADHART study, researchers Le Melledo and Perez-Parada (2005) found that the participants who received Sertraline had a 14.5% incidence of severe cardiovascular (CV) events, which was defined to include MI, agina, congestive heart failure, stroke, and death, while the control group, not receiving an SSRI, had an incidence of 22.4%. The authors of this article report that, although the number of severe CV events was different between the two groups, there was not a significant difference in the number of overall CV events. The authors also reviewed a trial that included the use of Fluoxetine versus placebo in 27 patients with MDD post-MI. Fluoxetine was found to be safe in this population, though the authors caution that the trial did not begin early after MI, leaving the

possibility of negative outcomes, including the potential for a higher rate of cardiac events, during the most vulnerable timeframe.

The team comprised for the ENRICHD Investigators (2004) performed a post-hoc analysis of the results from the ENRICHD study. This study looked at whether or not treating depression and low social support after MI reduces negative CV events, including recurrent infarction and death. The ENRICHD study used the BDI for assessment of depression. Treatment in this study included individual CBT, group CBT when possible, and use of Sertraline for up to one year. The post-hoc analysis showed that "patients in the intervention arm who exhibited a 10 point or greater increase in BDI scores were 1.6 times more likely to die in the ensuing months than were the patients whose BDI score did not change, and 2.5 times as likely to die as those patients who BDI score decrease by 10 or more points during treatment," (Carney, Blumenthal, Freedland, Youngblood, Veith, et al, 2004).

Discussion

The literature review revealed that the majority of researchers found a significant correlation of depression with the post-MI period. Although the diagnosis of depression was made using a variety of assessment tools, varying between the different studies, the results appeared to be consistent. With the acknowledgement of depression in the post-MI population, research has also been done to evaluate the negative outcomes for those suffering from depression post-MI. Though not all studies have agreed, the majority concur that the presence of depression post-MI increases mortality for this population.

Although the research has shown that there is a likelihood for increased mortality with the presence of post-MI depression, routine screening for depression in patients post-MI has not been recommended by all researchers, with some researchers arguing that this practice would be "resource intensive," while other researchers found that simple tools that can be administered by support staff in a clinic are valid, adequate, and worth the use of resources.

The results of some of the major studies, especially the SADHART and ENRICHD studies, have lead to multiple post-hoc analyses, looking at the outcomes of treatment for depression post-MI. SSRIs

are currently the most thoroughly studied medications in the post-MI population, specifically Sertraline, Citalopram, Paroxetine, and Fluoxetine, with the majority of research showing that they are a safe and effective option, though the research for each individual medication is limited. However, other studies argue that research with the presence of complicating factors, including co-morbidities and polypharmacy, is not adequate enough to apply the safety and efficacy to all patients post-MI. CBT and cardiac rehabilitation have been shown to be effective at decreasing depression post-MI, but have not been studied in detail with regard to improving mortality for this population. However, in building on the finding that decreasing depression will decrease mortality, it can be inferred that these methods may be effective options.

Implications for Practice

Some of the key implications for advanced practice nurses to become aware of the prevalence of post-MI depression and to understand the importance of assessing for depression to decrease mortality, and integrate this intervention into their practice. The studies reviewed for this paper were based on research in which the initial assessment was completed during the hospitalization for the acute event. Although this has occurred in the instances involving research studies, there are not current guidelines to suggest that depression screening occur during initial hospitalization. During hospitalization, the patient who has experienced an MI is followed by a cardiology team. The cardiologist is expected to address the patient's care in the acute setting and develop a plan to manage the patient's cardiac conditions. This may not incorporate the patient's mental health status. The psychological well-being may be overlooked if the primary care provider (PCP) does not follow-up when the patient returns to primary care after hospitalization.

With the awareness of the prevalence of depression post-MI and the understanding that it is unlikely that it was assessed for in the hospital setting, there is the question of when providers should screen for depression post-MI. The research described above indicates that there is a potential benefit for treatment of depression, thereby indicating a benefit of screening. There is not a clear recommendation

for a specific depression screening tool. There are a variety of tools available, including the PHQ2, PHQ9, and the BDI, which, also described above, appear to have adequate validity and utility in practice. This would indicate that provider preference is appropriate with regard to which tool to use. There is also not a clear recommendation at this time for a screening time frame after hospitalization, making it, at this time, up to provider discretion. There is not an implication that there is harm in assessment for depression at any time post-MI. Therefore, the benefits of diagnosing depression post-MI far outweigh any side effects of the screening process.

If a patient is screened for depression and found to have adequate criteria for a diagnosis of depression after MI, there is a question of whether or not treatment is appropriate. The review of the literature revealed that, quantifiably differing between studies, a certain number of cases of post-MI depression will be time-limited and resolve without medication. There is not a clear way of differentiating these cases from those that will become persistent depression, other than ongoing assessment. Unless the provider feels there is strong case for spontaneous remission, the evidence of the multiple articles outlined above show the potential to decrease mortality by using an SSRI to manage post-MI depression.

If a provider does determine that treatment is appropriate, the research against the use of TCAs is adequate to avoid the use of these medications in the treatment of post-MI depression. Additionally, the use of specific SSNRIs should be avoided with certain conditions, including hypertension, as described in the literature review. There is research to suggest that use of SSRIs is safe and effective for this population. However, the research does indicate a need to weigh a variety of other factors when selecting the appropriate drug from this class, including assessing the other medications that a patient may be taking to determine arrhythmia risk and risk for side effects of increasing low-density lipoprotein (LDL) or weight gain. There are a variety of SSRIs available, of which Lexapro has the lowest number of cytochrome P450 (CYP450) enzyme interactions and may be an option for patients who are currently on an extensive number of medications, though this medication has not been directly studied for post-MI depression. If a patient begins to have excessive weight gain or increase in LDL level, then the PCP will

need to do a cost-benefit analysis to determine if continuation of the medication is appropriate. As with all treatment, many factors and side effects need to be examined to determine the best method of treatment.

With the multitude of factors that must be weighed when determining whether or not to screen and/or treat post-MI depression, the provider should consider the research that is available to indicate the increased utilization of health care resources and potential for increased negative cardiac events, including mortality, with the presence of post-MI depression. With this in mind, it is important for this issue to be addressed, likely in the primary care setting, to assist patients with management of this diagnosis. Provider judgment will be paramount for determining the appropriate medication for each specific case, recognizing that, with current research, SSRIs have shown to be the most safe and effective option. Additionally, cardiac rehabilitation and CBT have shown benefits including decreasing depression, though research has not yet been done to show a correlation with mortality (positive or negative) directly related to these therapies. Inference would suggest that if these therapies are able to decrease depression, and as a result, decrease in depression decreases mortality, there would likely be a benefit with the addition of CBT and/or cardiac rehabilitation.

Implications for Research

There is a need for continued research to help define clear recommendations for screening and treatment of post-MI depression. This research should include a study that looks at the direct relationship of SSRI use and the change in outcomes for patients diagnosed with post-MI depression. The research that has been done in this arena is primarily based on post-hoc analysis of studies that were designed with a different objective in mind. Additionally, the safety and efficacy of SSRI use in patients who are on other cardiac medications is in need of further research. The exclusion criteria of previous studies was too stringent to have a true picture of SSRI interaction with other therapies in a cardiac population.

Further research on options for decreasing post-MI depression might include other medications that may prove, with further study, to be safer and more effective than the SSRIs, including the potential of SSNRIs. CBT may also be more integral to management of post-MI depression, but the research is not

there at this time. By furthering research in these areas, it would be possible to develop a treatment plan for those who do not respond to the SSRIs, or whose current medication regimen make them poor candidates for SSRIs.

As mentioned above, it would be helpful in the development of recommendations for management of post-MI depression to determine a timeframe for diagnosis and implementation of treatment. It is unclear at this time if there is a time when treatment implementation may be more harmful than beneficial. A comparative study of patients diagnosed and treatment initiated during hospitalization versus patients diagnosed and treatment initiated at the first primary care visit after hospital discharge, which may be weeks later, would be beneficial.

Another research study to examine length of therapy would also be helpful when determining recommendations for management of post-MI depression. Current research has shown the positive benefits of SSRI use change over time (Litinas, Fareed, Omer, et al., 2010), as well as research that has shown outcomes may become equal between groups treated for depression and those not treated at two years (Kurdyak, Gnam, Goering, et al., 2008). This implies that there is possibly a time when it is most important to start therapy, as well as a time when it would be appropriate to discontinue medication. Awareness of both of these would allow for more clear recommendations/guidelines.

A final implication for future research is the potential for differences between ethnic groups and/or age groups in terms of response to therapy and the efficacy of various treatment modalities. Additional research, with inclusion of demographic information, would further drive the accuracy of treatment recommendations.

Implications for Education

The information presented in this paper suggests that provider education would increase awareness of post-MI depression. There are not clear guidelines or recommendations that will translate into a formula for the new provider, but having the awareness and acknowledging the prevalence will be an early step in allowing the new provider to build a foundation for clinical judgment regarding

recognition and management of post-MI depression. There is potential, with further research, that guidelines will be developed and recommendations could then become a piece of the curriculum for the advanced practice nurse or family medicine provider.

Another significant implication for treatment is the education of the patient and, when appropriate, the patient's family. It is important to discuss the possibility of depression post-MI with a patient after he/she returns for primary care after MI. The patient may be experiencing symptoms of depression, but be unaware of what these symptoms mean, and further, not knowing what can be done about them. Additionally, the patient's family may observe symptoms of depression that the patient is unaware of. By educating patients and their families about the prevalence of depression after an MI and discussing symptoms that they can look for, they become involved in their care. They may even have preferences with regard to medications to treat depression that can assist providers in guiding their plan of care. The collaboration of patient, family, and provider will allow for more successful recognition and management of post-MI depression.

Conclusion

Given the prevalence of post-MI depression, it is an important part of primary care to integrate the recommendations described above into current practice. By recognizing depression post-MI and initiating treatment, providers will be able to assist patient with improving outcomes and decreasing mortality. The current research guides treatment toward use of SSRIs with or without the combination of CBT and/or a cardiac rehabilitation program. With the use of this knowledge and the promotion of patient involvement in planning care, an appropriate treatment regimen can be determined and implemented. Ongoing research will likely continue to modify this recommendation, and improve outcomes for patients who experience post-MI depression.

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